

REMARKS

Upon entry of this amendment, claims 1 and 3-11 are all the claims pending in the application. Claim 2 is canceled by this amendment.

I. Objection to the Drawings

The Examiner has objected to the drawings for the reasons set forth on page 2 of the Office Action. In particular, the Examiner asserts that reference character “53” is not mentioned in the description, and that the reference character “43” is not shown in the drawings. Applicants have amended the specification to include the reference character “53” and to delete the reference character “43” (see page 17, line 13 of the marked-up substitute specification). Accordingly, Applicants kindly request that the objection be reconsidered and withdrawn.

II. Objections to the Specification

As indicated on page 3 of the Office Action, the Examiner has objected to the specification due to minor informalities. Applicants submit herewith a substitute specification and abstract which address the Examiner’s objections and include various editorial amendments that have been made for grammatical and general readability purposes. No new matter has been added. Also enclosed is marked-up copy of the original specification and abstract showing the changes incorporated into the substitute specification and abstract.

Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the objection to the specification.

III. Objection to the Claims

The Examiner has objected to claim 9 for the reasons set forth on page 3 of the Office Action. Applicants have amended this claim in a manner to overcome the Examiner's objection. Accordingly, Applicants respectfully request that the objection to claim 9 be reconsidered and withdrawn.

IV. Claim Rejections

The Examiner has rejected claims 1, 3, 5, 8 and 9 under 35 U.S.C. § 102(b) as being anticipated by Hall et al. (EP 0 922 637 A2), and has rejected claims 2 and 4 under 35 U.S.C. § 103(a) as being unpatentable over Hall et al.

Claim 1, as amended, recites the features of a heat controller that transforms its shape by heat generated in a power source, wherein the heat controller establishes a thermal connection between a radiator and the power source at a temperature that is at least a predetermined first temperature. Applicants respectfully submit that Hall does not disclose, suggest or otherwise render obvious such features.

Hall discloses a modular spacecraft battery system 36 for a satellite 20 which includes an east battery module 38, an east facing radiator 40, a west battery module 44, and a west facing radiator 46 (see Fig. 3). As shown in Fig. 3 of Hall, an east thermal switch 50 is provided that is able to connect the east battery module 38 to the east facing radiator 40, and a west thermal switch 52 is provided that is able to connect the west battery module 44 to the west facing radiator 46 (see paragraph [0020]).

As is also shown in Fig. 3 of Hall, a controller 54 in the form of a computer (see Abstract) is provided that is able to selectively control the opening and closing of the switches 50 and 52 (see paragraph [0021]). For example, as shown in Fig. 2 of Hall, as the satellite 20 exits eclipse 64, the controller 54 instructs the switch 50 to isolate the east sun lit battery 38 from its radiator 40 (i.e., enter the open state) while the west shaded battery 44 is being recharged (see paragraph [0025]).

Similarly, the west battery 44 of Hall undergoes recharging until such time as the satellite reaches the high noon point of its orbit, at which time the controller 54 instructs the switch 52 to return to the open state and the switch 50 to enter the closed state, such that the fully charged west battery 44 is disconnected from its radiator, while the east battery 38 is connected to its radiator and its recharging begins (see paragraph [0025]).

Thus, while Hall discloses thermal switches 50 and 52 that change between an opened and closed position at different locations in orbit based on an instruction from the controller 54, Applicants respectfully submit that the switches 50 and 52 of Hall do not transform their shape by heat generated in one of the associated batteries 38 and 44.

That is, according to claim 1, the heat generated by the power source is responsible for causing the transformation in shape of the heat controller, whereas in Hall, the heat from the batteries 38, 44 is not responsible for changing the positions of the switches. Instead, in Hall, it is the instruction from the heat controller 54 that is responsible for causing the switches 50 and 52 to change between an open and closed position.

Moreover, Applicants note that Hall also discloses that by opening the thermal switch when the battery is near its minimum desired temperature, the need for a battery heater is reduced or eliminated as the battery will not be excessively cooled (see col., 7, lines 46-49). As noted above, however, amended claim 1 recites that a thermal connection is established between the radiator and the power source at a temperature that is at least a predetermined first temperature.

Applicants respectfully submit that disclosure relating to the opening of a switch when the battery is near a minimum desired temperature would not suggest to one of ordinary skill in the art that the switch should be closed when the battery reaches at least a first predetermined temperature. Further, similar to the discussion above, Applicants note the thermal switches of Hall are not capable of changing position by the heat from of one of the batteries 38 and 44, but instead, can only change position based on an instruction from the controller 54.

In view of the foregoing, Applicants respectfully submit that Hall fails to disclose, suggest or otherwise render obvious the above-noted features of a heat controller that transforms its shape by heat generated in a power source, wherein the heat controller establishes a thermal connection between the radiator and the power source at a temperature that is at least a predetermined first temperature, as recited in claim 1.

Accordingly, Applicants submit that claim 1 is patentable over Hall, an indication of which is respectfully requested. Claims 3-5, 8 and 9 depend from claim 1 and are therefore

considered patentable at least by virtue of their dependency. As noted above, claim 2 has been canceled by this amendment.

V. Allowable Subject Matter

Applicants thank the Examiner for indicating that claims 6, 7, 10 and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims.

VI. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may best be resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Respectfully submitted,

Hirokazu KIMIYA et al.

By: Kenneth W. Fields
Kenneth W. Fields
Registration No. 52,430
Attorney for Applicants

KWF/abm
Washington, D.C. 20006-1021
Telephone (202) 721-8200
Facsimile (202) 721-8250
March 23, 2005